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62224

7590

05/13/2010

ADELI & TOLLEN, LLP
11940 San Vicente Blvd., Suite 100
LOS ANGELES, CA 90049

EXAMINER

WERNER, DAVID N

ART UNIT

PAPER NUMBER

2621

DATE MAILED: 05/13/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,265	11/17/2003	Thomas Pun	APLEP0037	6487

TITLE OF INVENTION: METHOD FOR IMPLEMENTING AN IMPROVED QUANTIZER IN A MULTIMEDIA COMPRESSION AND ENCODING SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$0	\$0	\$1510	08/13/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

62224 7590 05/13/2010
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Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/716,265	11/17/2003	Thomas Pun	APLE.P0037	6487
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TITLE OF INVENTION: METHOD FOR IMPLEMENTING AN IMPROVED QUANTIZER IN A MULTIMEDIA COMPRESSION AND ENCODING SYSTEM

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nonprovisional	NO	\$1510	\$0	\$0	\$1510	08/13/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
WERNER, DAVID N	2621	375-240040

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____
Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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ADELI & TOLLEN, LLP 11940 San Vicente Blvd., Suite 100 LOS ANGELES, CA 90049			WERNER, DAVID N	
			ART UNIT	PAPER NUMBER

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DATE MAILED: 05/13/2010

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 500 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 500 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/716,265

Applicant(s)

PUN ET AL.

Examiner

David N. Werner

Art Unit

2621

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the response filed 5 April 2010.
2. ☒ The allowed claim(s) is/are 1,3,4,7,8,10-13,16,18,19,32,34,35 and 37-43.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ali Makoui on 11 May 2010.

The application has been amended as follows:

Claim 1 is to read:

A method of quantizing a particular macroblock of a particular frame in a sequence of digital video frames, the particular frame having a frame type, said method comprising:

determining a buffer occupancy accumulator for the particular frame as a difference between an actual amount of bits used to encode a previous frame having the same frame type as the particular frame and a requested amount of bits for the previous frame having the same frame type as the particular frame;

limiting ~~[[an]]~~ a maximum amount of change differently for each frame type in said buffer occupancy accumulator ~~based upon the frame type from its previous value for the same frame type;~~
and

encoding said particular macroblock using a quantizer value computed based on said buffer occupancy accumulator, wherein the determining, limiting, and encoding are performed by [[an]] a digital video encoder.

Claim 3 is to read:

The method of claim 1, wherein said limiting the maximum amount of change in said buffer occupancy accumulator is performed by clipping said buffer occupancy accumulator with respect to a target number of bits of the particular frame.

Claim 4 is to read:

The method of claim 1, wherein said limiting the maximum amount of change in said buffer occupancy accumulator is performed by scaling said buffer occupancy accumulator with respect to a target number of bits of the particular frame.

Claim 16 is to read:

A non-transitory computer readable medium storing a computer program which when executed by a processor quantizes a particular macroblock of a particular frame in a sequence of digital video frames, the particular frame having a frame type, the computer program comprising sets of instructions for:

determining a buffer occupancy accumulator for the particular frame as a difference between an actual amount of bits used to encode a previous frame having the same frame type as the particular frame and a requested amount of bits for the previous frame having the same frame type as the particular frame;

limiting [[an]] a maximum amount of change in said buffer occupancy accumulator ~~based upon the frame type from its~~ previous value for the same frame type; and

encoding said particular macroblock using a quantizer value computed based on said buffer occupancy accumulator.

Claim 18 is to read:

The computer readable medium of claim 16, wherein said limiting the maximum amount of change in said buffer occupancy accumulator is performed by clipping said buffer occupancy accumulator.

Claim 19 is to read:

The computer readable medium of claim 16, wherein said limiting the maximum amount of change in said buffer occupancy accumulator is performed by scaling said buffer occupancy accumulator.

Claim 39 is to read:

A method of quantizing a particular macroblock of a particular frame of a particular frame type in a sequence of digital video frames, said method comprising:

determining a base quantizer value;

determining a quantizer adjustment based on multiplying a scaling function by (i) the difference between a number of bits actually used to encode previous macroblocks of the particular frame of the particular frame type and a number of bits that should have been used to encode previous macroblocks of the particular frame and (ii) a normalized activity level of the particular macroblock, wherein the scaling function is different for different macroblock coding methods; and

encoding said particular macroblock based on a quantizer value computed as a sum of the base quantizer value and the quantizer adjustment,

wherein determining the base quantizer value, determining the quantizer adjustment, and encoding are performed by [[an]]a digital video encoder.

Claim 42 is to read:

A method of determining a quantizer value for quantizing a particular macroblock of a particular frame having a particular frame type in a sequence of digital video frames, said method comprising:

when the particular frame is a first frame type, computing a number of bits that should have been used to encode all previously encoded macroblocks of the particular frame by using a first formula;

when the particular frame is a second frame type, computing a number of bits that should have been used to encode all previously encoded macroblocks of the particular frame by using a second formula;

determining a delta value comprising a difference between a number of bits actually used to encode all previous macroblocks of the frame and the computed number of bits that should have been used; and

quantizing said particular macroblock using a quantizer value computed as a sum of a base quantizer value and a quantizer adjustment, said quantizer adjustment computed by multiplying (i) the determined delta value, (ii) a scaling function that is different for different macroblock coding methods, and (iii) a normalized activity level of the particular macroblock,

wherein the computing, determining, and quantizing are performed by [[an]]a digital video encoder.

Double Patenting

2. In the First Action on the Merits, Claims 1, 4, 16, and 19 were provisionally rejected for double patenting against co-pending Application No. 10/716,316. Applicant requested that any further action on the double-patent rejection be placed in abeyance until the claims were allowed. Upon further review of the claims as presently amended in both this application and the co-pending application, the two applications are now patently distinct. The previous double-patent rejection is WITHDRAWN.

Allowable Subject Matter

3. The following is an examiner's statement of reasons of allowance: Claims 1 and 16 are directed to a patentable system of quantizing a particular macroblock for a frame in a digital video sequence, in which the quantization is dependent on different buffer occupancy accumulators for each frame type within the video sequence, and in which the buffer occupancy accumulators each may have a limited maximum amount of change dependent on their respective frame types. In MPEG-2 Test Model 5, in contrast, the range of a final value of a quantization parameter is the same for each frame type.

4. The following is an examiner's statement of reasons for allowance: Claims 39 and 42, previously objected to but found to have allowable subject matter, have been

re-written in independent form including all limitations of their base claims. See 4 January 2010 Non-Final Rejection for a full discussion of the allowable subject matter of these claims as currently presented.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Application Publication 2002/012672 A1 discloses a transcoder that uses internal parameters to maintain picture coding type but vary quantization parameters according to picture type. U.S. Patent Application Publication 2002/0136304 A1 discloses a wavelet-based encoder that uses maximum and minimum quantization tables according to frame type, and choosing from a table within range according to picture characteristics. U.S. Patent Application Publication 2003/0072364 A1 discloses an optimizing encoder that uses a look-up table for quantization parameters, with look-up tables produced according to characteristics including picture type. MPEG-2 Test Model 5 Chapter 10, Rate Control and Quantization, is added to the record to provide a more complete disclosure of the background of the invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621